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0006201734 20051201.

**Title**A bidirectional **coherent acoustic** communication system for **underwater** vehicles.**Conference information**

IEEE Oceanic Engineering Society. OCEANS'98. Conference Proceedings, Nice, France, 28 Sept.-1 Oct. 1998.

**Source**

IEEE Oceanic Engineering Society. OCEANS'98. Conference Proceedings (Cat. No.98CH36259), 1998, vol.1, p. 482-6 vol.1, 5 refs, pp. 3 vol. xxxi+1853, ISBN: 0-7803-5045-6.

Publisher: IEEE, New York, NY, USA.

**Author(s)**[Freitag-L](#), [Grund-M](#), [Singh-S](#), [Smith-S](#), [Christenson-R](#), [Marquis-L](#), [Catipovic-J](#).**Author affiliation**

Freitag, L., Grund, M., Singh, S., Woods Hole Oceanogr. Instn., MA, USA.

**Abstract**

An **acoustic** modem for bidirectional communication with an unmanned **underwater** vehicle has been developed and installed on the Florida Atlantic University Ocean Explorer. The modem is used to test and demonstrate two-way **phase-coherent communications** between surface platforms and AUVs. However, in addition to serving as a testbed for investigating specific issues associated with high-rate vehicle **communications**, the modem has been used in actual practice to transmit vehicle status information, CTD data and compressed images to observers on the surface in near real-time. The system includes both medium frequency (2-4 kHz) and high frequency (20-30 kHz) transmission capability for short and medium range data uplink, as well as a towed array for reception at the medium frequency (MF) and a small vertical array for use at the high frequency (HF). The communication system has been tested in Florida, New England and the Bahamas where ranges of 2 km at HF and 4 km at MF have been achieved at burst rates of 6700 bps and 1670 bps respectively in water depths of 10-30 m.

**Descriptors**[!\[\]\(98c78cd2a2ac28d8c69439852e303d4f\_img.jpg\) ACOUSTIC-DEVICES](#); [!\[\]\(39769ea04f2e8afe2152796ed00787cf\_img.jpg\) ACOUSTIC-TRANSDUCER-ARRAYS](#); [!\[\]\(ab521bb5d029e301cb2e5cbefcf6ebcc\_img.jpg\) MODEMS](#); [!\[\]\(f9f0296a781c8055879cc3e9f44a1ece\_img.jpg\) REMOTELY-OPERATED-VEHICLES](#); [!\[\]\(b161e98e4ae8d5abcf6ebec6724c4457\_img.jpg\) UNDERWATER-ACOUSTIC-TELEMETRY](#); [!\[\]\(107f5b4cd4901670adef4ca2f39751da\_img.jpg\) UNDERWATER-VEHICLES](#).**Classification codes**[B6270 Other-telecommunication-systems-and-equipment\\*](#);[B6210J Telemetry](#);[B6220J Modems](#).**Keywords**[bidirectional-coherent-acoustic-communication-system](#); [underwater- vehicles](#); [acoustic-modem](#); [unmanned-underwater-vehicle](#); [Florida-Atlantic-University-Ocean-Explorer](#); [two-way-phase-coherent- communications](#); [AUV](#);

vehicle-status-information; CTD-data; compressed- images; data-uplink; towed-array; vertical-array; burst-rates; 6700-bit/s; 10-to-30-m; 2-to-4-kHz; 1670-bit/s; 20-to-30-kHz.

**Treatment codes**

P Practical;

X Experimental.

**Numerical indexing**

bit rate: 6.7E03 bit/s.

depth: 1.0E01 to 3.0E01 m.

frequency: 2.0E03 to 4.0E03 Hz.

bit rate: 1.67E03 bit/s.

frequency: 2.0E04 to 3.0E04 Hz.

**Language**

English.

**Publication type**

Conference-proceedings.

**Availability**

CCCC: 0 7803 5045 6/98/\$10.00.

**Digital object identifier**

10.1109/OCEANS.1998.725794.

**Publication year**

1998.

**Publication date**

19980000.

**Edition**

1999012.

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**Inspec - 1898 to date (INZZ)**

**Accession number & update**

0005545558 20051201.

**Title**

Multicarrier coherent communications for the **underwater acoustic** channel.

**Conference information**

OCEANS 96 MTS/IEEE Conference Proceedings. The Coastal Ocean - Prospects for the 21st Century, Fort Lauderdale, FL, USA, 23-26 Sept. 1996.

Sponsor(s): Marine Technol. Soc; OES; IEEE.

**Source**

'Prospects for the 21st Century' Conference Proceedings. OCEANS 96 MTS /IEEE (Cat. No.96CH35967), 1996, vol.3, p. 1125-30 vol.3, 6 refs, pp. 4 vol. (1564+vii+145), ISBN: 0-7803-3519-8.  
Publisher: IEEE, New York, NY, USA.

**Author(s)**

Bejjani-E, Belfiore-J-C.

**Author affiliation**

Bejjani, E., Belfiore, J.-C., Dept. Commun., Ecole Nat. Supérieure des Télécommun., Paris, France.

**Abstract**

We propose a multicarrier transmission scheme for severely spread channels-but not overspread. The **underwater acoustic** channel is a good representative of this kind of channel. The technique of orthogonal data and pilot symbols allows **coherent** detection and therefore the use of QAM signal constellations. Some simulated performances of the proposed scheme are presented in both Rayleigh and Rician multipath fading. Acceptable error rate floors are shown to be possible for channel spread factor reaching 0.15.

**Descriptors**

ACOUSTIC-SIGNAL-DETECTION; FADING; MULTIPATH-CHANNELS; QUADRATURE-AMPLITUDE-MODULATION; RAYLEIGH-CHANNELS; RICIAN-CHANNELS; UNDERWATER-SOUND.

**Classification codes**

B6270 Other-telecommunication-systems-and-equipment\*;

B6120 Modulation-and-coding-methods.

**Keywords**

**multicarrier-coherent-communications**; **underwater-acoustic-channel**; **multicarrier-transmission-scheme**; **severely-spread-channels**; **orthogonal-data**; **pilot-symbols**; **coherent-detection**; **QAM-signal-constellations**;

performances; Rayleigh-multipath-fading; Rician-multipath-fading; error-rate-floors; channel-spread-factor.

**Treatment codes**

T Theoretical-or-mathematical.

**Language**

English.

**Publication type**

Conference-proceedings.

**Availability**

CCCC: 0 7803 3519 8/96/\$5.00.

**Digital object identifier**

10.1109/OCEANS.1996.569060.

**Publication year**

1996.

**Publication date**

19960000.

**Edition**

1997014.

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